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Of Foreign Honorary Members we have elected, —

Major-General Edward Sabine, in place of Admiral Duperrey, in Class II., Section 1.

M. Chevreul in Class I., Section 3.

One of our members, Dr. C. H. F. Peters, has been transferred from the list of Resident Fellows to that of Associate Fellows in Class I., Section 2.

Five hundred and ninety-seventh Meeting.

June 23, 1868. — ADJOURNED ANNUAL MEETING.

The PRESIDENT in the chair.

The memoirs of the Foreign Honorary Members deceased during the year were read from the Council's Annual Report by the Corresponding Secretary and Professor Lovering.

Nominations by the Council were read.

The Statute Meeting for August was adjourned to the second Tuesday in September, and a Special Meeting was appointed for the first Tuesday in July.

Five hundred and ninety-eighth Meeting.

July 7, 1868. — SPECIAL MEETING.

The PRESIDENT in the chair.

The President called the attention of the Academy to a circular letter announcing the celebration at Berlin of the fiftieth anniversary of Ehrenberg's Doctorate.

On the motion of Dr. Bowditch the following vote was passed: —

"Resolved that this Academy desires to express their sincere congratulations to Dr. Ehrenberg for his long and honorable services in the cause of science, and requests their President, Dr. Asa Gray, and Professor Joseph Lovering, to represent them on this interesting occasion."

Professor Lovering made a communication on the application of Electricity to maintaining the vibrations of a tuning-fork, and of the tuning-fork to exciting and sustaining the vibration of threads or cords.

The elements which comprise the essential features of the machine, now exhibited, are not original. The application of electricity as the maintaining power for such rapid vibrations as belong to tuning-forks is not new, though it is of recent discovery; and the application of tuning-forks to exciting sympathetic vibrations in cords is not new, though it is also of recent discovery. I am not aware, however, that these two discoveries have been united into one, by employing a tuning-fork, *so impelled*, for this particular purpose. Such tuning-forks have already been made and used by Koenig for producing the Lissejous' curves, and for exhibiting the phenomena of interference of sounds; and this new application, therefore, is sufficiently obvious, and may have been already anticipated by other physicists. The tuning-forks in *ut*, etc., manufactured by Koenig for repeating Melde's experiments on the vibrations of cords, are only adapted to short threads of saddler's silk. My object has been to provide a tuning-fork which would not be overloaded with a stout cord of thirty or forty feet in length.

The prongs of my tuning-fork are thirty inches in length, two inches in width, and three eighths of an inch in thickness; and, in spite of the encumbrance of the cord, they will vibrate for many minutes without the aid of electricity, making excursions of one half of an inch on each side of the position of equilibrium. The outer face of each prong, when at rest, is exposed to one pole of an electro-magnet, at the distance of three fourths of an inch from it. The iron core of this electro-magnet has a circular section of an inch and one fourth in diameter, and is wound with copper wire to the depth of two inches.

The extremities of this iron core carry nearly cubical blocks of soft iron, of about one inch and a half in linear dimension, through which are screwed pieces of iron of one half of an inch in thickness. The ends of these pieces are the acting poles, and are screwed through the blocks, in order to adjust the distance between the poles of the magnet and the prongs of the tuning-fork. With four cups of Bunsen's battery, the zincs of which are cylinders, four inches in diameter and seven inches in height, and connected for *intensity*, the magnet has strength sufficient to initiate the motion of the prongs, at the distance even of three fourths of an inch, and to bring them soon into energetic vibration. The current of electricity runs through the stem of the tuning-fork into the lower prong, near the extremity of which, and upon the interior surface, is a small platinum plate which is touched by the point of a platinum wire. This platinum wire is attached to the end of a short spring. When the current begins to flow, the prongs of the tuning-fork are attracted outwards, the platinum plate is withdrawn from the platinum wire, the flow of the electrical current is interrupted, and the prongs of the tuning-fork are free to spring together again, without the retarding influence of the magnetic poles. The tuning-fork itself, therefore, interrupts the current at each of its vibrations, so as to be subject to an accelerating force of magnetism, when its prongs are moving *outwardly*, without a corresponding retarding action, when they are moving *inwardly*.

The vibrations of this tuning-fork are so energetic, and the amplitude of its excursions is so large, that the ends of the prongs often strike the poles of the electro-magnet. The tuning-fork easily commands the motion of a stout cord, thirty or forty feet in length, which vibrates as a whole, or in segments, whenever the tension is such as to make any one of the harmonics of the cord correspond to the note of the tuning-fork. The middle of the segments sweeps through a breadth of two or three inches, and the eye easily recognizes the nodes, and other peculiarities of vibrating cords, even when the rate of vibration is too slow to produce any acoustic effect. In this way, all the laws of vibrating strings may be illustrated to the coarsest eye even more satisfactorily than is possible with the most highly educated ear."

Five hundred and ninety-ninth Meeting.

September 8, 1868. — ADJOURNED STATUTE MEETING.

The RECORDING SECRETARY in the chair.

Professor Lovering made the following communication on the Periodicity of the Aurora Borealis: —

As this paper will appear in full in the Memoirs of the Academy, over three hundred pages of which are already printed, only a brief abstract will be given in this place. I was incited to the study of the laws of periodicity of the aurora by the absence of any recorded appearances of this display, in this country, before the early part of the eighteenth century, — a failure in the record which could not easily be